

# iPhone Programming Team

## iPhone Application Programming Lecture I: Introduction



Prof. Jan Borchers  
Media Computing Group  
RWTH Aachen University  
Winter Semester 2013/2014  
<http://hci.rwth-aachen.de/iphone>



- Prof. Jan Borchers
- Chat Wacharamanotham, M.Sc.
  - [chat@cs.rwth-aachen.de](mailto:chat@cs.rwth-aachen.de)
- Student Assistant: Aaron Krämer
- Specialized topic presenters



Research projects summer 2011  
Available at: <http://hci.rwth-aachen.de/videos/iphone1314/S01/i10Project2013.m4v>



# We Are in the App Store

# Class Goals



- Understand the differences between desktop and mobile development
- Look at a software framework designed from scratch
- Illustrate how established software engineering patterns are applied in the real world

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# Class Topics

# Format

- Mobile application design principles
- iOS development basics
- View controllers & dialogs
- Input techniques
- Performance tweaking
- Data Persistence
- Networking
- iPad programming
- Location & maps
- Audio

- Lecture
  - Tue 9:15–11:45, room 2222
  - Reading assignments
- Lab (20 spots)
  - Mon 16:15–17:45, room 4U15
  - 6 programming assignments
  - Final project with presentation (TBA)
- Final exam: 10.03.14, 9:00–11:00 at room 2222

	3 ECTS Lecture only	6 ECTS Lecture + Lab
Assignments		10%
Project		20%
Final Exam	100%	70%

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# Requirements

- OOP experience
- No Mac required
  - We will supply Macs & iPods for the lab
- You must register for this course in CAMPUS
- Lab: apply before Friday Oct. 18th at: <http://hci.rwth-aachen.de/iphone>

# iPhone Developer University Program

- RWTH is member of the iPhone Developer University Program
- Free on-device development for all students throughout the semester
  - Invites will be sent to your RWTH email address
- You need to accept Apple's student agreement (online)

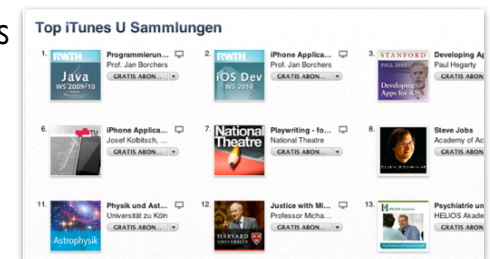
All slides and lecture videos will be available on iTunesU



<http://hci.rwth-aachen.de/iphone>

## Why Take this Class?

- We know HCI, OS X, and iOS
  - Projects, publications, AATCe
- High iTunes U ranking
- Updated to latest iOS 7



## Developing for Mobile Platforms

## The iOS Family



## Mobile Device Characteristics

- Screen size is compact
- Memory is limited
- Users interact with one screen at a time
- Users interact with one application at a time
- Onscreen help is minimal
- Context is key (task focus, peripheral use)

User falls while texting

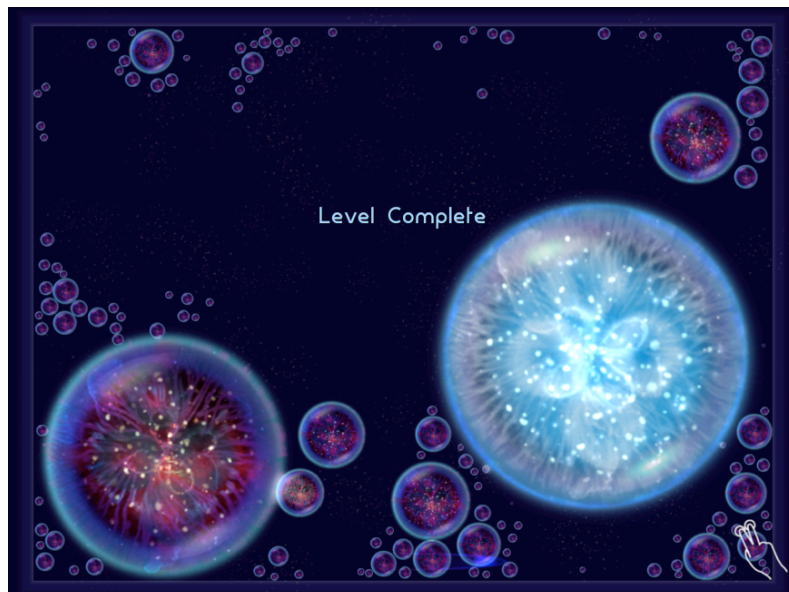
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## 9 Golden Rules of Interface Design (see DIS I)

- Keep the interface simple
- Avoid errors, help to recover, offer undo
- Speak the user's language
- Design clear exits and closed dialogs
- Be consistent and predictable
- Include help and documentation
- Provide feedback
- Offer shortcuts for experts
- Minimize memory load



Onscreen help in Osmos HD

Drill down structure  
example: Notes

Available at: [http://  
hci.rwth-aachen.de/  
videos/iphone1314/S01/  
Notes\\_iOS7.mov](http://hci.rwth-aachen.de/videos/iphone1314/S01/Notes_iOS7.mov)

# Life as an App

- The iPhone is an app-centric environment
- One app per task
- Do one thing but do it well
- Data is stored per app
- Data exchange between apps is difficult
- Define the task that users want to accomplish with your app

# Designing the UI

- Make it obvious how to use your application
- Sort information from top to bottom
- Minimize text input
- Express information succinctly
- Provide fingertip-size targets



# Interaction Design

- Multitouch interaction is still new
- Interaction patterns not established yet
- Follow Apple's examples if possible
- If you use complex gestures, help the user

# Standard Gestures

	Tap	To press or select a control or item (analogous to a single mouse click).
	Drag	To scroll or pan.
	Flick	To scroll or pan quickly.
	Swipe	In a table-view row, to reveal the Delete button.
	Double tap	To zoom in and center a block of content or an image. To zoom out (if already zoomed in).
	Pinch open	To zoom in.
	Pinch close	To zoom out.
	Touch and hold	In editable text, to display a magnified view for cursor positioning.

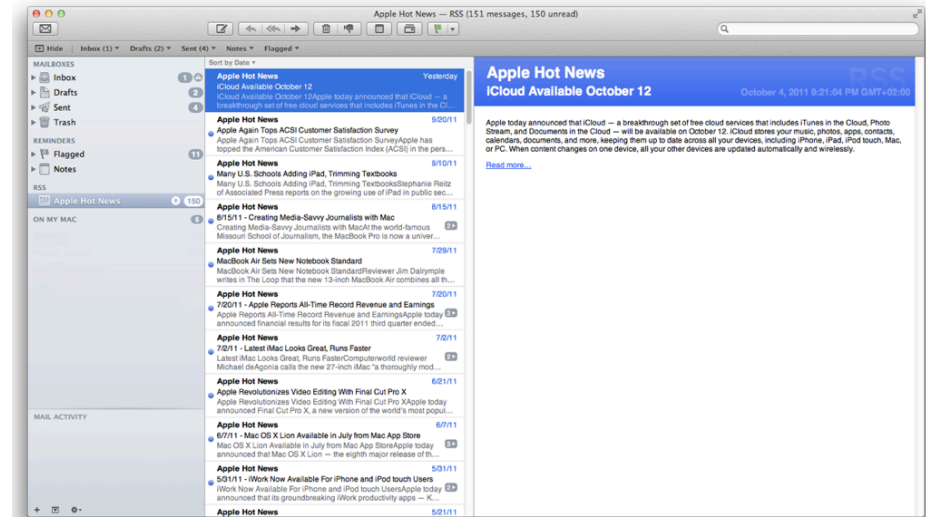
# Designing the UI

- Five resolutions, three aspect ratios:

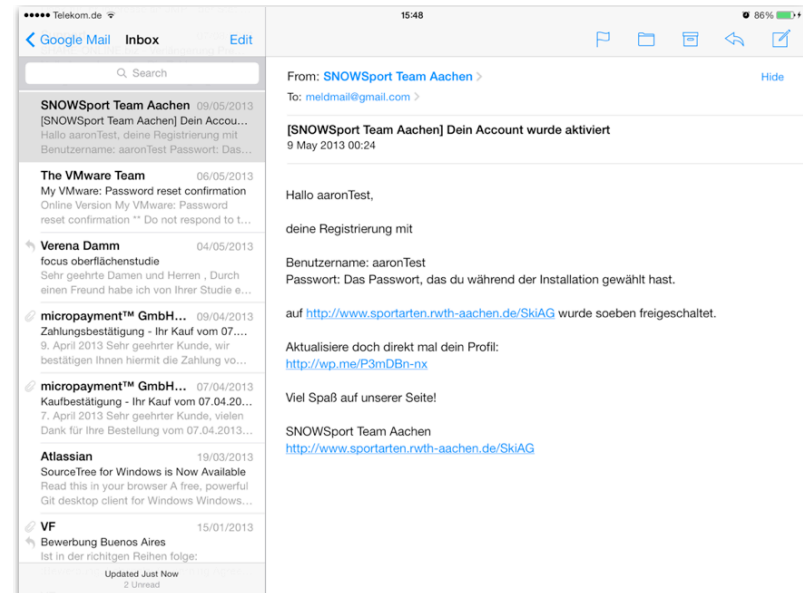
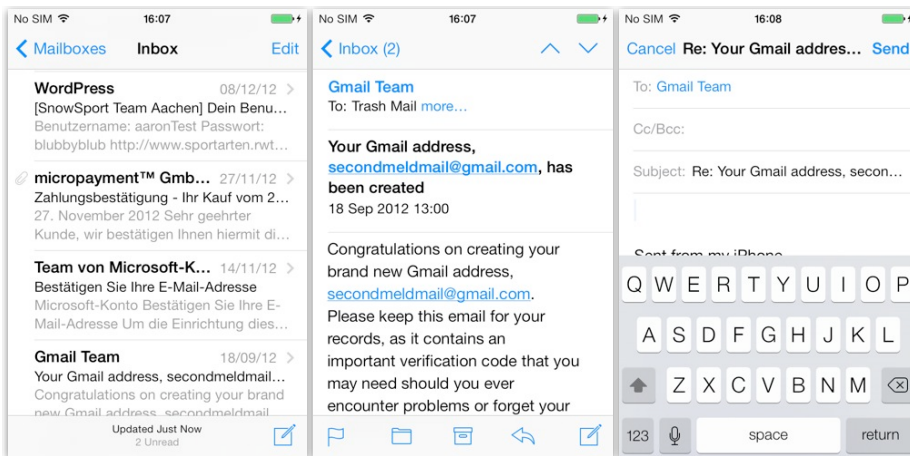
	Resolution	
	Classic	Retina
iPhone	320 x 480	640 x 960
iPhone 5(S, C)		640 x 1136
iPad	1024 x 768	2048 x 1536
iPad Mini	1024 x 768	

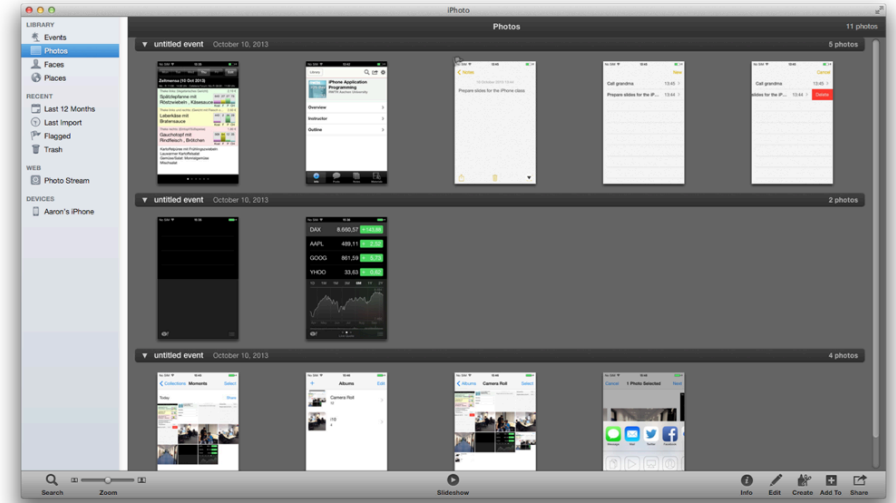
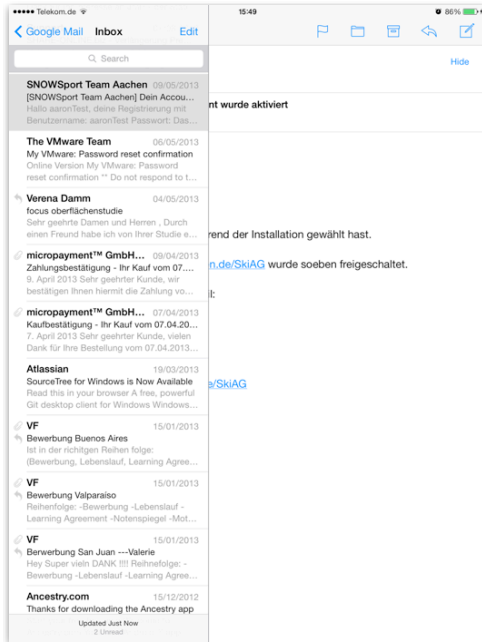


- Device orientation:
  - Portrait or landscape
- Designing for the iPad requires more than increasing the resolution



Converting desktop application to mobile: Mail





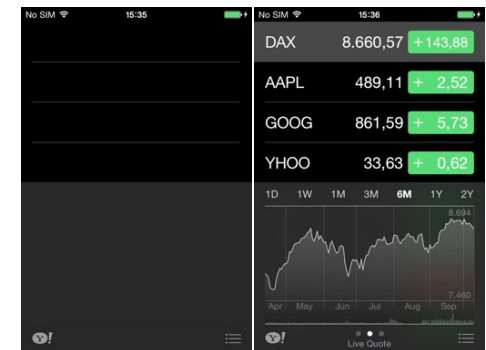
Converting desktop application to mobile: iPhoto

## Starting

### Photos app in iOS 7

Available at: [http://hci.rwth-aachen.de/videos/iphone1314/S01/Photos\\_iOS7](http://hci.rwth-aachen.de/videos/iphone1314/S01/Photos_iOS7)

- Apps should start quickly to provide a fluid user experience
- Show a launch image that closely resembles the first screen of your app
- Restore the state of last run
- By default, launch in portrait orientation.



# Stop

- No *Quit* button or menu item
- Be prepared to quit at any time
- Program flow interrupted by external events
  - Incoming phone call
- Store state when stopping
- Application moved to background

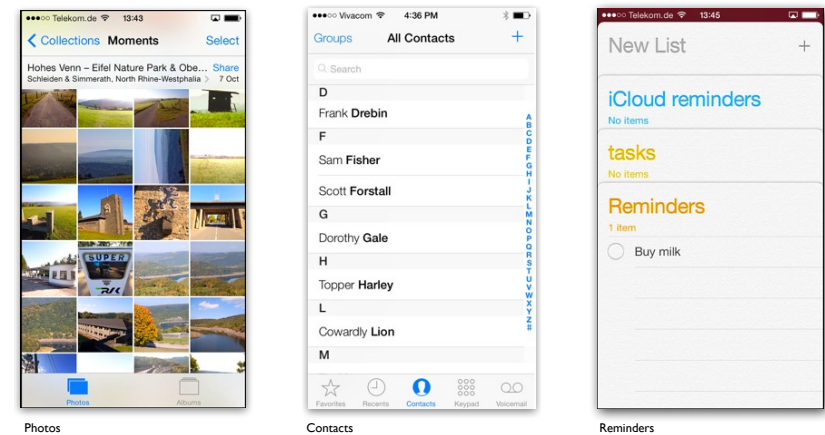
# Application Styles



# Productivity Applications

- Organizing and managing detailed information
- Often organize data hierarchically
- Organizing the list, add or remove items
- Examples: Contacts, Photos

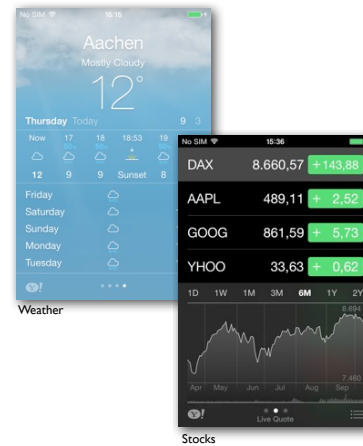
# Productivity Applications





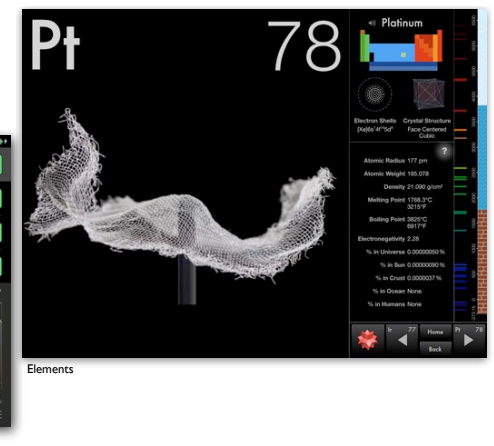
# Utility Applications

- Simple task, minimum user input
- Customized, visually attractive UI that enhances the displayed information
- Data is organized in flattened list of items
- Examples: Weather, Stocks



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# Utility Applications



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# Immersive Applications

- Full-screen, visually rich UI
- Focussed on content and user experience
- Tends to hide much of the device's user interface
- Custom navigational methods
- Examples: Living Earth, Carpenter



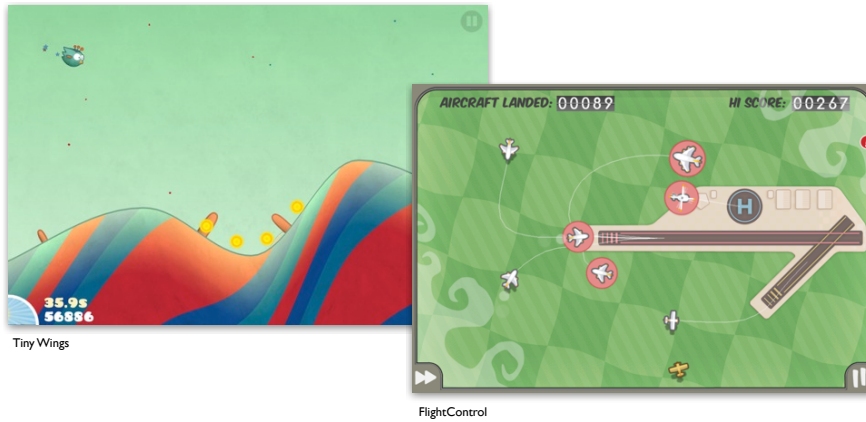
Living Earth



Carpenter

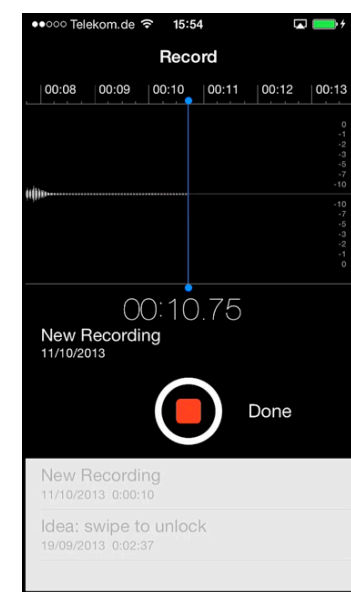
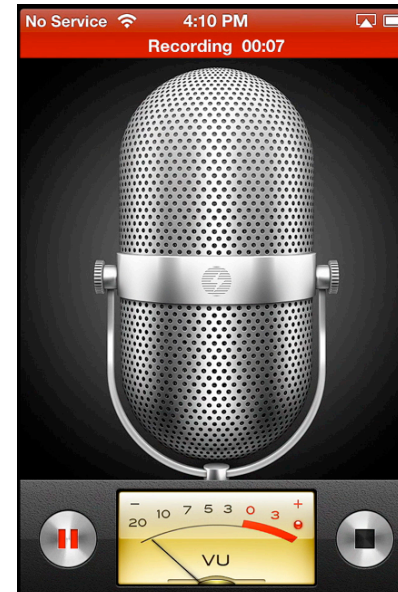


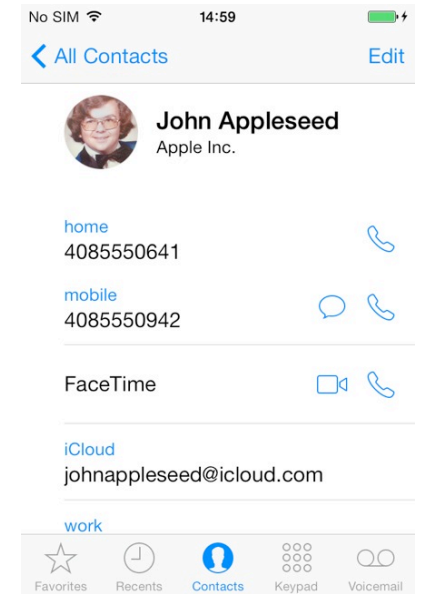
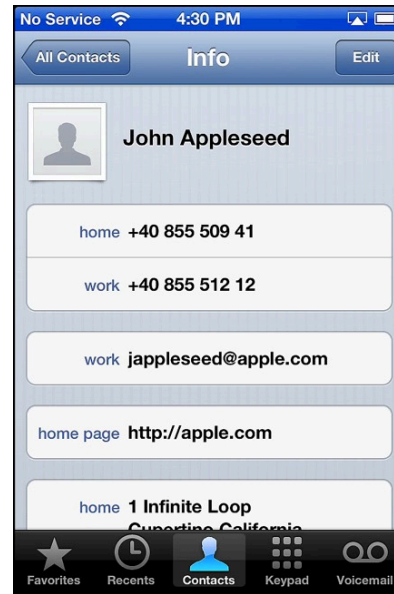
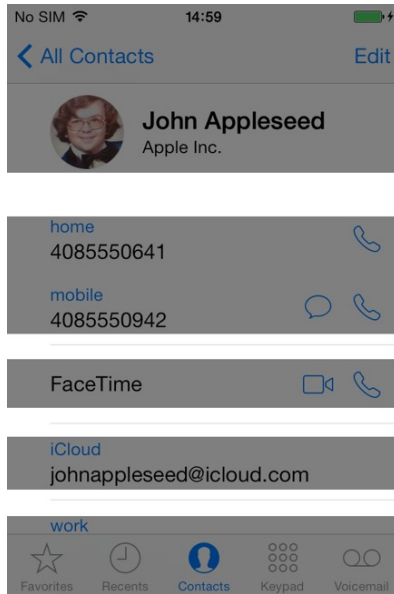
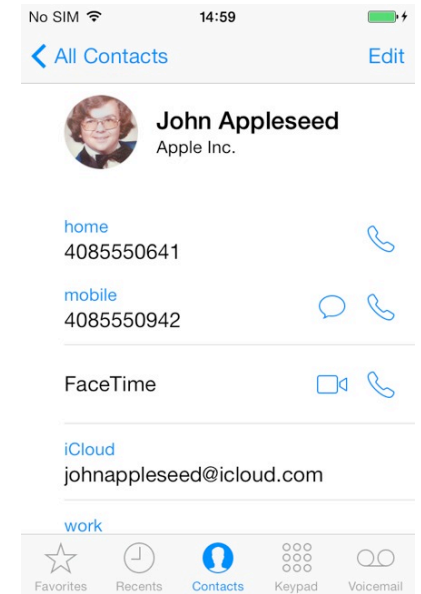
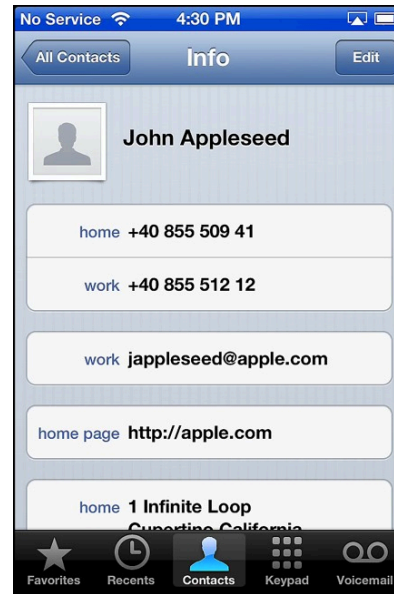
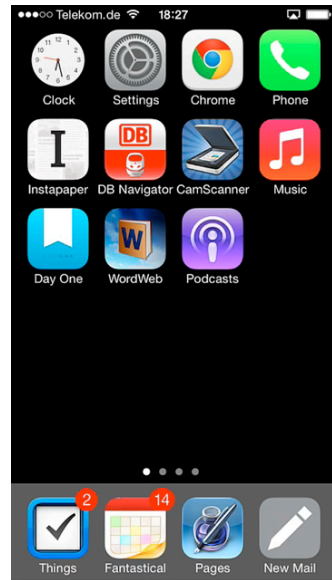
# Games

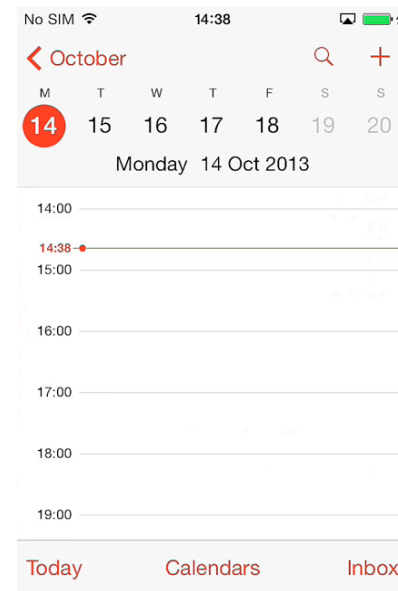
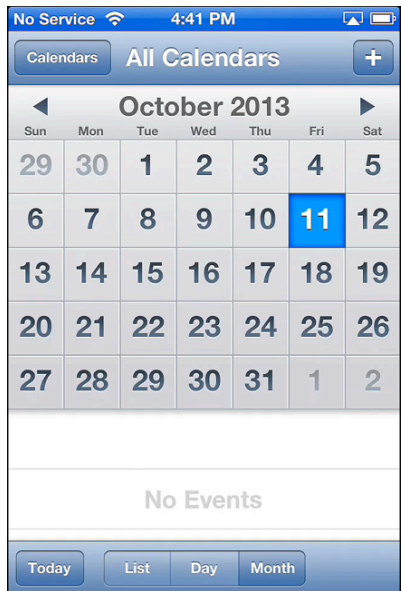
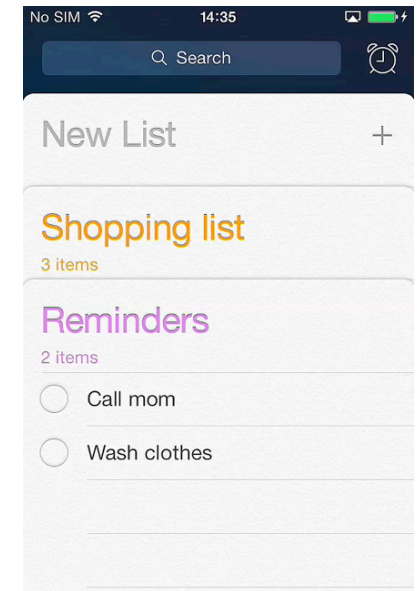
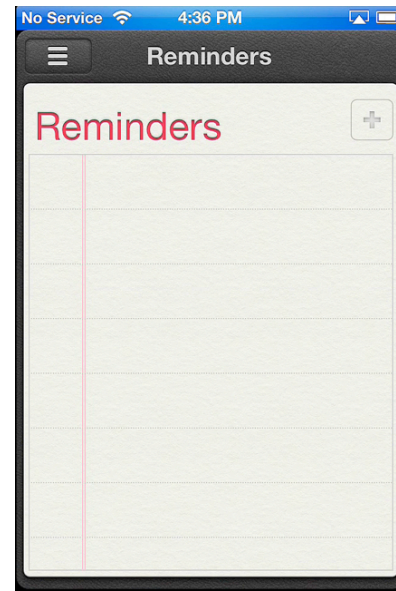
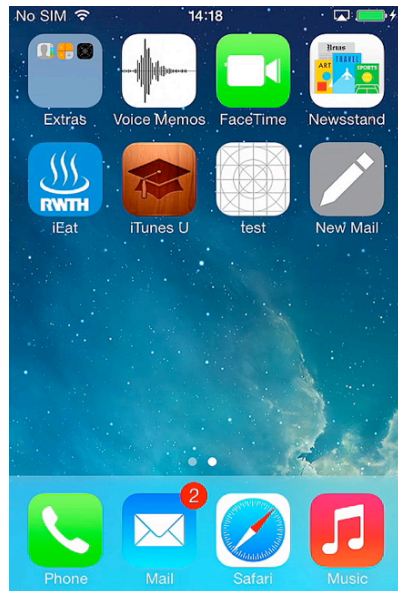
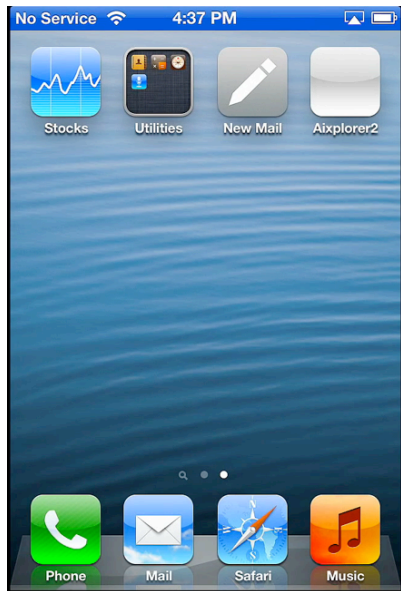


# iOS 7 Design Themes

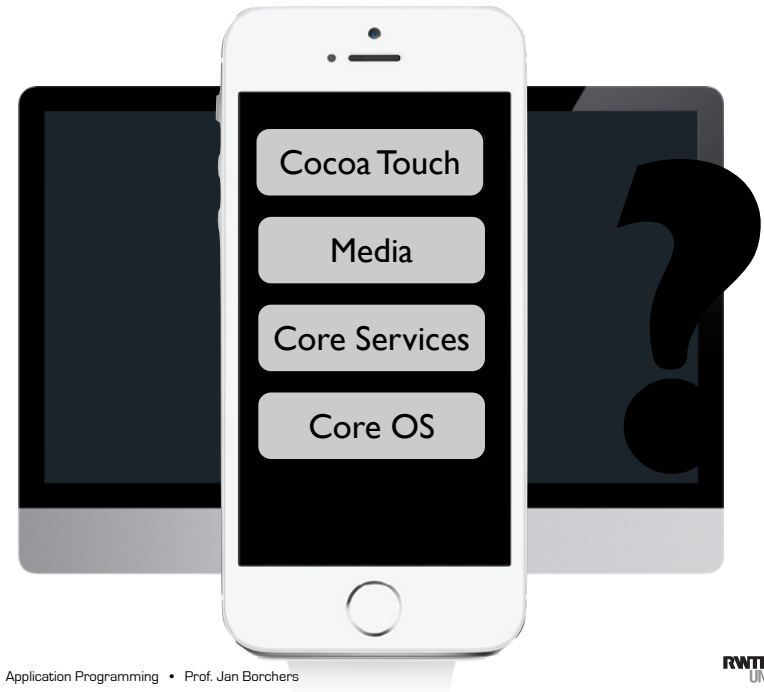
- **Deference:** The UI helps users understand and interact with the content, but never competes with it.
- **Clarity:** Text is legible at every size, icons are precise and lucid, adornments are subtle and appropriate, and a sharpened focus on functionality motivates the design.
- **Depth:** Visual layers and realistic motion impart vitality and heighten users' delight and understanding



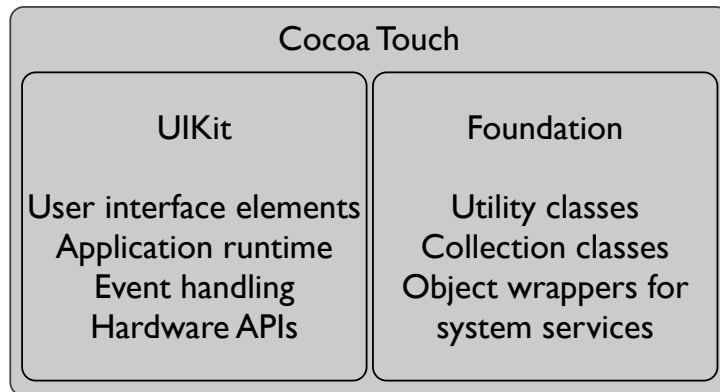




# iOS Architecture: Overview



# Cocoa Touch Architecture



# iPhone OS Frameworks





# Summary

- Mobile vs. desktop apps: user, task, [context](#)
- Keep hardware restrictions in mind
- Application styles: productivity, utility, immersive
- Reading assignment:



Selected iOS Human Interface Guidelines and WWDC videos  
See [hci.rwth-aachen.de/iphone](http://hci.rwth-aachen.de/iphone) for the list  
(required reading for exam and final project)